IDAHO DEPARTMENT OF FISH AND GAME

ANNUAL REPORT

CLARK FORK HATCHERY

1992

Prepared by:

John Thorpe, Fish Hatchery Superintendent II
Daniel Beers, Fish Hatchery Superintendent I
Bill Harryman, Fish Culturist

INTRODUCTION

The Clark Fork Hatchery is a resident species "specialty" station located on Spring Creek 1.5 miles northwest of Clark Fork, Idaho. Approximately 25,000 westslope cutthroat broodstock are held on station providing the State's only captive source of westslope cutthroat trout eggs. In addition to westslope cutthroat trout, brook, brown, golden, Kamloops, and rainbow trout, as well as grayling, are reared for distribution in the waters of Region 1. Over 125,000 rainbow trout >9 inches are received each year from production hatcheries in southern Idaho and redistributed from March through October. Originally constructed by the Work Projects Administration in 1934 and completed in 1938, the Clark Fork Hatchery is now funded for operation by Idaho Department of Fish and Game (IDFG) license fees. Water diverted from Spring Creek provides for incubation and rearing, with flows of 8-15 cfs at temperatures averaging 41°F in winter and 48°F in summer. A well provides approximately 100 gpm of 45°F water to one bank of incubators. Unused well water can be diverted to fiberglass rearing troughs to mix with Spring Creek water. Rearing units include Heath incubator stacks, concrete and fiberglass early rearing vats, concrete raceways, and earthen broodstock ponds.

FISH PRODUCTION

Trout production at the Clark Fork Hatchery addresses three different objectives: 1) maintenance of a captive westslope cutthroat broodstock of 25,000 adults to spawn at age 4 and 5 years; 2) production of 300,000 6-inch or greater westslope cutthroat for large lake stocking; and 3) rearing westslope cutthroat and various other salmonid species to less than 3 inches for release in mountain and lowland lakes (Table 1). Eggs are collected on station (Table 2), as well as received from public and private sources.

During 1992, the total number of brood fish was reduced to 11,700 from 23,000 fish in 1991 (Table 1). The broodstock management plan was altered in an attempt to improve genetic purity. For the past two years, broodstock from the Clark Fork strain westslope cutthroat trout, which carry 0.2% rainbow trout genes, have been replaced by genetically pure westslope cutthroat obtained from the Montana State Washoe Park Hatchery broodstock. These fish were reared from eggs at both the Cabinet Gorge and Sandpoint hatcheries prior to arrival at the Clark Fork Hatchery. An increase in average length of the broodstock population was observed in 1992, with adults averaging 12.2 inches (range 9.9-15.5 inches), up from a 1991 average length of 11.9 inches (range 9.5-14.4 inches).

During 1992, 117,899 (8,358 lb) brood year 1990 6-inch plus westslope cutthroat trout were released. Another 60,000 (2,825 lbs) 5-inch brood year 1991 westslope cutthroat were transferred to net pens on Lake Pend Oreille for rearing to release in 1993. In the fall of 1991, production requirements for 1992 and subsequent releases were reduced by 100,000 fish. In response, 168,785 (3,479 lbs) 4-inch brood year 1991 westslope cutthroat were stocked in the spring of 1992 to keep inventories at the new levels. Other fingerling releases included 5,289 (173 lbs) brood year 1990 5-inch Henrys Lake brook trout planted in Mirror Lake. The fry releases of brood year 1992 fish included 11,279 (126 lbs) Henrys Lake brook trout, 42,711 (109 lbs) westslope cutthroat, and 10,190 (5 lbs) domestic Kamloops. The fry were released in lowland and mountain lakes.

Annual costs to rear and distribute fish from Clark Fork Hatchery are listed in Table 3.

HATCHERY IMPROVEMENTS

During October 1991, construction of six 4 ft X 4 ft X 40 ft concrete intermediate rearing raceways was completed. These replace six older raceways which were too shallow for optimum rearing of westslope cutthroat trout. The new units were put into service in the spring of 1992. The fish reared in these ponds appear to be growing better than fish of the same age reared at other areas of the hatchery. Data collected during 1993 will evaluate this rearing environment.

Hatchery personnel finished remodeling one end of the old crew's quarters, that now serves as our office, to produce a laboratory work area.

Major construction needs include:

1. A pump and piping to supply pathogen-free water for rearing broodstock, eggs, and fry. One well, with a tested flow of 1,000 gpm, was drilled and capped in 1989.

2. Construction of concrete broodstock ponds to replace the earthen ponds now in use.

3. Construction of additional covered shop/garage space to facilitate vehicle/equipment repair or construction during inclement weather.

FISH HEALTH

Maintaining a disease-free population at the Clark Fork Hatchery continues to be hampered by the water system. The majority of rearing water comes from Spring Creek, which harbors a population of brook trout; shown in past samples to carry Infectious Pancreatic Necrosis (IPN). Additionally, losses to Bacterial Kidney Disease (BKD), although never catastrophic, have been chronic in the westslope cutthroat broodstock and production lots.

Brook trout at Clark Fork suffer a spring drop-out in April each year. Although the outward symptoms resemble those of IPN, laboratory analysis had never isolated viral pathogens until 1992. During August, heavy mortalities were experienced in brood year 1992 brook trout and brood year 1992 westslope cutthroat. Most fish continued to feed actively and did not appear stressed. Samples were sent to the Eagle Fish Health Laboratory for analysis. A positive result for IPN was noted (Table 4). There were no secondary infections, therefore no disease treatment was administered. Elevated mortalities were observed until mid-October, when water temperature dropped, and were back to normal by the first of November. Inventories at the hatchery were still large enough to meet the 1993 planting requests if no other catastrophes occur. Losses in two lots of fry from the Montana strain brood fish were 99% in one lot, with no apparent outbreak of IPN in the other.

During October, the fish in large raceway number four were taken off feed in preparation to move some of them to the net pens in Pend Oreille Lake. After the fish were moved to the net pens and the remaining fish were put back on feed, heavy mortalities were noticed in the unit. The signs were similar to those experienced in 1991 under like circumstances. The 1992 fish were fed a smaller size feed of the same formulation and the mortalities ceased immediately. After one week on the smaller feed, the fish were again fed the larger feed with no adverse effects. It was surmised, when fish are taken off feed for an extended period of time and feeding resumes, mortalities can occur due to gorging. This phenomenon only seems to occur when feeding Bioproducts feed.

CLRKFORK

RECOMMENDATIONS

An underlying obstacle to preventing disease at the Clark Fork Hatchery is surface water source. Even if eggs received are obtained from disease-free sources, continued introduction of water which harbors pathogen-infected populations of fish predisposes Clark Fork fish to infection. With the present water system, there is no hope of ever obtaining a disease-free certification. Further development of the production well drilled in 1989, and construction of covered concrete broodstock ponds, would be initial moves towards improving current operations. With pathogen-free water for rearing, disease-free westslope cutthroat eggs could be obtained from either wild or domestic sources and used to develop a viable broodstock.

FISH STOCKED AND TRANSFERRED

The Clark Fork Hatchery program distributes fish in Region 1 as directed by IDFG fishery management. The program includes: redistributing rainbow trout for put-and-take fisheries; distributing brown, brook, and cutthroat trout fingerlings for put-grow-and-take fisheries; distributing brook, cutthroat, golden, and Kamloops trout fry and grayling to remote sites; and redistributing warm and cool water game fish into Region 1 waters.

Clark Fork Hatchery personnel redistributed approximately 134,121 size 3 (>9 inches) rainbow trout to waters of Region 1, north of Couer d'Alene, from March to October 1992. These trout were received from the American Falls and Hayspur hatcheries.

Releases of cutthroat, domestic Kamloops, brown trout, and grayling were delivered to 27 mountain lakes by backpack and helicopter.

During October and November 1992, 60,000 5-inch brood year 1991 westslope cutthroat were transferred to net pens in Lake Pend Oreille for rearing to release in May 1993.

FISH SPAWNING

The Clark Fork Hatchery maintains a captive westslope cutthroat broodstock population to provide for needs within Region 1. Inability to maintain a disease-free population prevents transfer of eggs or fish to other regions. Presently, nearly 11,700 two- to four-year-old brood fish are held to spawn in their fourth and fifth year. This provides a potential for taking two million green eggs, yielding from 1-1.5 million eyed eggs. During past years, the egg requirement has varied substantially. Fish requirements have ranged from over one million "button up" fry for nursery stream release to 150-350 thousand two-year-old 6-inch fish for release in large lakes. To maintain a broad range of flexibility for fishery management staff, the broodstock population has been held to meet the high-end requirement. Excess fry are released, to comply with regional preference, when annual population analysis and stocking requirements have been completed.

During the 1992 spawning season, May 5 to May 27, 1992, 1,683,701 eggs were collected (Table 2). Average fecundity in 2,835 females was 593 eggs/female. A saline diluent was utilized during fertilization, and buffered Iodophor disinfection solutions were used to water-harden eggs. A 73% eye-up occurred resulting in 1,233,561 eyed eggs; well above the expected 50-60% experienced in

the past. An implementation of loading density and treatment regimes could be part of the reason for greater success.

In 1991 we began phasing out the Clark Fork strain westslope cutthroat as future broodstock and replacing them with genetically pure westslope cutthroat received from Montana. These trout are reared at both the Cabinet Gorge and Sandpoint hatcheries prior to their transfer to the Clark Fork Hatchery as age 1+ fish. On December 31, 1992, the age 2+ fish averaged 10.0 inches and the age 3+ fish were around 13.2 inches; that is, about 15% larger than the Clark Fork broodstock of the same age. The warmer water temperature during early rearing at the Cabinet Gorge Hatchery was probably responsible for this increased size. The affect of this accelerated growth on size or age at maturity and egg production remains to be evaluated.

FISH FEED

Normal production feeding utilizes Bioproducts Inc. (Warrenton, Oregon) Biodiet starter and Biodry 4000 diet with ration quantity adjusted to growth on a daily basis. The feed projection program used Haskell's formula with Delta L adjusted for expected monthly water temperature. Data on Spring Creek daily water temperature has been collected since 1980, and feed tests utilizing a variety of diets, feed delivery techniques, and rearing densities over the past three years have been utilized to institute the current program. Feed utilized and total cost during 1992 is found in Table 5.

PUBLIC RELATIONS

Public relations efforts in 1992 were similar to those of previous years. There were approximately 3,000 visitors to the station again this year. Hatchery personnel made efforts to talk with as many of them as possible. As always, numerous tours were scheduled and provided to public and private schools, 4-H and FFA groups, agencies which work with tours for handicapped people and senior citizens, as well as families.

Less time was spent with the Lake Pend Oreille Idaho Club in 1992, since the net pen project was turned over to Sandpoint Hatchery in 1991. Dealings with members of this group in other matters shows that the positive working relationships developed during the establishment of the net pen rearing project continue. The Boundary Backpackers and Rocky Mountain Academy were helpful again in 1992. Members of these clubs planted cutthroat fry in 15 mountain lakes for us.

The fish culturist presented the Region 1 Fisheries Overview slide program to six classes at Sandpoint High School.

Clark Fork Hatchery has been stocking a newly-created pond near the east shore of Priest lake. Bull Moose Lake was built cooperatively between IDFG and The Huckleberry Bay Company to provide an accessible, low-tech fishery without special harvest regulations in the Priest Lake area. The lake was stocked and opened to the public in July 1991. Since that time, Bull Moose Lake has proven to be very popular with local residents and campers alike.

SPECIAL PROJECTS

During the year we have spent many hours on projects away from the hatchery. We have assisted Region 1 personnel with data collection to determine fish populations in several north Idaho lakes. We clipped 25,000 catchable trout for fisheries management investigations and helped set numerous gill nets for the project.

An experiment to determine early rearing effects on maturation age of kokanee was started. The study is designed to see if lengths of fry at release effects the age at which kokanee mature. This will be a four-year study that may effect how kokanee fry are reared before release.

FEED EXPERIMENT

A feed experiment was conducted from June 1, 1992 to October 31, 1992 to test efficiency differences between Bioproducts BioDry 4000 and Moore Clark semi-dry when fed to westslope cutthroat at the Clark Fork Fish Hatchery. Two short raceways, number 3 and 4, were used for the experiment. These are new ponds 4 feet wide, 4 feet deep, and 40 feet long. The depth of these ponds allows feed to be available longer than in the old 18-inch deep raceways. A standard production rearing environment was used for the experiment. The fish were fed according to the hatchery feed projection program. For consistency, the daily growth projection used by the program remained the same between the two units throughout the experiment regardless of measured growth. On August 24, the fish were thinned to prevent overcrowding. Only those fish remaining in units 3 and 4 continued on the experiment until it was concluded on October 31, 1992. The resulting data is contained in Table 6.

Both feeds performed in a similar manner. Although there was a much better conversion rate with BioDry 4000 feed early in the experiment, the Moore Clark feed conversion improved greatly by the end of the test period. The normal feed at Clark Fork Hatchery is BioDry 4000. It is common for fish to be slow in accepting a change in feed formulation resulting in poor feed utilization. If the feed was delivered for the same price, some savings could be experienced by using the BioDry 4000.

ACKNOWLEDGEMENTS

We would like to thank the U.S. Forest Service for providing air time with their helicopter to stock mountain lakes. We would also like to thank the Boundary Backpackers Club, Rocky Mountain Academy, and Region 1 personnel for packing fish to mountain lakes. A special thanks to the U.S. Forest Service for planting larger brown trout in mountain lakes with the use of helicopter and fire bucket. Without their help the project could not have been accomplished. These groups were of great assistance in completing the mountain lakes stocking program.

Table 1. Fish production at Clark Fork Hatchery, January 1, 1992 to December 31, 1992.

SPECIES & STRAIN	SOURCE	BEGINNING NUMBERS	BEGINNING POUNDS	ENDING NUMBER	ENDING POUNDS	NUMBER STOCKED	POUNDS STOCKED	DESTINATION
BROOK TROUT BDYR90	HENRY'S LAKE	6,075.0	93.0	0.0	0.0	5,209.0	173.0	MIRROR LAKE
BROOK TROUT BDYR91	HENRY'S LAKE	*49,800.0	*EGGS	0.0	0.0	11,279.0	162.0	MIRROR LAKE
CUTTHROAT C2BDYR87	CLARK FORK	8,363.0	8,711.0	0.0	0.0	0.0	0.0	COMBINED WITH C2BDYR88 BROODSTOCK
CUTTHROAT C2BDYR88	CLARK FORK	8,090.0	4,494.0	1,071.0	1,409.0	0.0	0.0	BROODSTOCK
CUTTHROAT C2BDYR89	MONTANA	6,870.0	2,082.0	6,013.0	4,889.0	0.0	0.0	BROODSTOCK
CUTTHROAT C2BDYR90	CLARK FORK	160,031.0	6,382.0	0.0	0.0	117,899.0	8,358.0	REGION 1
CUTTHROAT C2BDYR90	MONTANA	*5,240.0	*420.0	4,638.0	1,616.0	0.0	0.0	BROODSTOCK
CUTTHROAT C2BDYR91	CLARK FORK	433,907.0	1,171.0	200,640.0	11,577.0	168,785.0	3,479.0	REGION 1
CUTTHROAT C2BDYR92	CLARK FORK	*1,148,361.0	*EGGS	373,179.0	1,573.0	42,711.0	109.0	MOUNTAIN LAKES
CUTTHROAT C2BDYR92	MONTANA	*85,200.0	*EGGS	4,135.0	12.0	0.0	0.0	BROODSTOCK
KAMLOOPS K1BDYR91	GLOYD SPRINGS	7,589.0	232.0	6,315.0	2,746.0	0.0	0.0	STILL HAVE ON HAND
KAMLOOPS K1BDYR92	GLOYD SPRINGS	*14,860.0	*EGGS	0.0	0.0	10,190.0	5.0	HIDDEN LAKE
KOKANEE KLBDYR91	SULLIVAN SPRINGS	*6,000.0	*15.0	4,509.0	104.0	0.0	0.0	EXPERIMENTAL FISH
TOTALS		*1,940,386.0	*23,599	600,500.0	23,926.0	356,073.0	12,281.0	

* Numbers include fish or eggs received or taken during the year as well as fish on hand at the first of the year.

Table 2. Spawning summary, Clark Fork westslope cutthroat (C2), January 1, 1992 to December 31, 1992.

STOCK	FEMALES SPAWNED	NO. EGGS COLLECTED	AVERAGE FECUNDITY	PERCENT EYE-UP	EYED EGGS
CLARK FORK	2,671	1,582,550	592	72.6	1,148,361
MONTANA	164	101,151	616	84.2	85,200
TOTALS	2,835	1,683,701	593	73.3	1,233,561

Table 3. Cost of fish produced at the Clark Fork Hatchery January 1, 1992 to December 31, 1992.

SPECIES	ACTUAL* PRODUCTION	WEIGHT** POUNDS	COST TO PRODUCE AND STOCK	COST PER 1,000 FISH	COST PER INCH
(BK)HENRY'S LAKE BROOK TROUT 3-5"	16,488	334	$4,000	$242.60	$0.050
(C2)CUTTHROAT BDYR90 >6"	177,890	10,966	$23,000	$129.29	$0.021
(C2)CUTTHROAT BDYR91 2-5"	168,785	13,885	$18,000	$106.64	$0.021
(C2)CUTTHROAT BDYR92 1"	42,711	1,681	$9,000	$210.72	$0.211
(KL)KAMLOOPS	10,190	2,514	$2,000	$196.27	$0.098

* Number of fish stocked does not include fish holdovers.
** Weight includes both stocked weight and increase in weight for 1992.

Table 4. Fish health report for Clark Fork Hatchery, January 1, 1992 to December 31, 1992.

DATE	LOG NO.	SPECIES/LOT	DIAGNOSIS	RESULTS
4/22/92	92-197	C2 BDYR91	NEGATIVE FOR VIRUS AND BKD	
4/22/92	92-180	C2 BDYR91	NEGATIVE FOR VIRUS AND BKD	
4/22/92	92-181	BK BDYR91	NEGATIVE FOR VIRUS AND BKD	
4/22/92	92-182	C2 BDYR90	NEGATIVE FOR VIRUS BACTY 1/8 Ps. aeruginosa	
4/23/92	92-189	BK BDYR91		HISTOLOGY BACKUP NECROSIS IN INTESTINAL MUCOSA
5/13/92	92-213	ADULT	NEGATIVE FOR VIRUS POSITIVE FOR BKD 39/60	
8/19/92	92-325	C2 BDYR92	POSITIVE FOR VIRUS 2/2 NEGATIVE FOR BKD	
8/18/92	92-326	BK BDYR91	POSITIVE FOR VIRUS 5/36 NEGATIVE FOR BKD	

Table 5. Fish feed used in 1992 at the Clark Fork Hatchery.

SIZE	SOURCE	POUNDS	COST/ POUND	TOTAL COST
BIODIET STARTER #1	BIOPRODUCTS	263.1	.86	226.27
BIODIET STARTER #2	BIOPRODUCTS	440.0	.86	378.40
BIODIET STARTER #3	BIOPRODUCTS	952.2	.86	818.90
BIODIET 1.0 MM	BIOPRODUCTS	375.4	.70	262.78
BIODRY 4000 1.0 MM	BIOPRODUCTS	1,521.5	.48	730.32
BIODRY 4000 1.3 MM	BIOPRODUCTS	276.2	.48	132.58
BIODRY 4000 1.5 MM	BIOPRODUCTS	5,801.0	.48	2,784.48
BIODRY 4000 2.5 MM	BIOPRODUCTS	9,150.3	.46	4,209.14
BIODRY 4000 3.0 MM	BIOPRODUCTS	9,820.0	.46	4,517.20
BIODRY 4000 4.0 MM	BIOPRODUCTS	400.4	.46	184.18
BIODRY 4000 5.0 MM	BIOPRODUCTS	287.2	.46	132.11
BIODRY 4000 6.0 MM	BIOPRODUCTS	5,397.7	.46	2,482.94
BIODIET BROOD 5.0 MM	BIOPRODUCTS	283.5	.48	136.08
BIODIET BROOD 6.0 MM	BIOPRODUCTS	78.0	.48	37.44
MOORE CLARK STARTER MASH	MOORE CLARK	23.9	.00	00.00
MOORE CLARK SEMI-DRY 1.0 MM	MOORE CLARK	217.7	.00	00.00
MOORE CLARK SEMI-DRY 2.1 MM	MOORE CLARK	2,161.8	.33	713.39
MOORE CLARK SEMI-DRY 3.2 MM	MOORE CLARK	750.0	.33	247.50
MOORE CLARK OMP 2 3/64	MOORE CLARK	112.2	.48	54.42
RANGEN GROWER 1/8	RANGEN	3,681.0	.22	809.82
TOTALS		41,993.1		18,857.95

Table 6. Feed experiment to test BioDry 4000 against Moore Clark Soft-moist.

FEED TYPE	UNIT NO.	DATES COVERED	START NUMBER	ENDING NUMBER	FISH LOSS	START POUNDS	END POUNDS	POUNDS GAINED	START LENGTH	END LENGTH	LENGTH GAINED	DELTA-L GAIN/DAY	LBS FED	CONVER-SION
BIODRY 4000	3	6/1-8/24	84,880	81,955	2,925	922	2,521	1,599	3.1426	4.4465	1.3039	.0153	2,022.7	1.256
MOORE CLARK SOFT-MOIST	4	6/1-8/24	89,250	87,021	2,229	975	2,320	1,345	3.1485	4.2394	1.0909	.0128	2,154.2	1.602
BIODRY 4000	3	8/24-10/31	38,324	38,037	287	1,185	1,719	534	4.4465	5.0263	.5798	.0085	911.2	1.706
MOORE CLARK SOFT-MOIST	4	8/24-10/31	39,801	39,527	274	1,066	1,680	614	4.2394	5.0413	.8019	.0118	946.9	1.542
BIODRY 4000	3	6/1-10/31	39,938*	38,037	1,614*	434*	1,719	1,285*	3.1426	5.0263	1.8837	.0123	1,828.9*	1.423
MOORE CLARK SOFT-MOIST	4	6/1-10/31	41,073*	39,527	1,272*	449*	1,680	1,231*	3.1485	5.0413	1.8928	.0124	1,911.8*	1.553

* Numbers were adjusted to allow for a constant population through out the experiment.